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AMENDMENT TO DRAWINGS

Figure 13 of the drawings is amended herein as required by the Examiner. In particular, Figure 13 is amended by replacing the reference number "315" with the correct reference number -- **316** --. Also, one of the reference numbers "307" is deleted from Figure 13 as it is unnecessary and incorrect, while the lead line for the other reference number "307" in Figure 13 is corrected to properly identify one of the two vertical rails mentioned in paragraph 71 of the specification.

Attachments: Replacement Sheets for Figure 13

Annotated Sheet for Figure 13 showing changes made

REMARKS

Reconsideration of the above identified application in view of the preceding amendments and the following remarks is respectfully requested.

Firstly, with respect to the objection to the reference number "315" in Figure 13, as indicated above, the correct reference number for this feature is **316** and the correct reference number is now shown in amended Figure 13. The lead line for reference 316 leads to one of two, parallel vertical plates. These support plates are specifically mentioned in paragraph 71 of the specification as originally filed. The two vertical rails 307 are mounted on these plates.

With respect to the objection to the abstract, the abstract has now been reduced so that it has no more than 150 words.

With respect to the corrections to the disclosure requested by the Examiner, each of these corrections have been made in paragraphs 5, 55 and 66. The applicant and its attorneys wish to thank the Examiner for pointing out these typographical errors in the disclosure.

Before turning to the Examiner's rejection of the claims on the grounds of anticipation and obviousness, the applicant's attorneys wish to comment briefly on the other amendments now being made to the disclosure. In particular, in the "SUMMARY OF THE INVENTION" section of the application, paragraphs 11, 13, 15 and 17 are being amended so that the wording thereof corresponds closely to the revised wording of independent claims 1, 11, 16 and 20. It is respectfully submitted that no new matter has been introduced into the specification by these amendments. In particular, with respect to the indication in these paragraphs and in the independent claims that the "support post" is elongate, it is respectfully submitted that the elongate nature of the support post is clear from the original drawings of this application, including, for example, Figures 1, 3, 4 and 5A/5B. The support post is of course feature 12 in Figures 1 and 3 and it is feature 12' in Figures 5A and 5B. It will also be recognized by the Examiner that many forms of

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posts are in fact elongate, for example, the well known fence posts are elongate, upright members that are mounted in the ground and used to support the rest of the fence. The two definitions of the word "post" found in the Concise English Dictionary are "a stake" or "a stout pole", both of which would generally be recognized to be elongate members.

Paragraph 43 is simply being amended to insert a missing word, namely the word "to".

Turning now to the anticipation rejection of a number of claims in the application on the basis of cited U.S. Patent No. 4,164,290 to Zankl, reconsideration of this objection is respectfully requested in view of the amendments that have now been made to several independent claims. It is respectfully submitted that the claims as amended are clearly and patentably distinguishable over the teachings of the Zankl reference. The Zankl patent teaches the use of a tool changer drum that is rotatably mounted on a machine bed 11 having a machining center 10. A tool spindle 20 is mounted on a head 16. The tool changer includes a frame 34 which is bolted to one end of the bed 11 and extends vertically. The tool changer drum 40 shown in Figures 7 and 8 is journaled to a frame arm 38 for rotation about a horizontal axis 42. This drum has a plurality of tool changer arms 46 which are swingably attached to the periphery of the drum for swinging movement along radii 48 (see Figure 10) between a storage position parallel to the central plane of the drum and a transfer position perpendicular to this central plane (shown in broken lines in Figure 9). Each arm 46 is swingably mounted within a housing 52 by a pin 54 and has a pinion gear 56 which engages a rack 58 that is slidably mounted in the housing, the latter being rigidly attached to the drum. It should also be noted that this tool changing mechanism is simply designed to place a new tool into the spindle 20 where it can be used to carry out a machining operation. In other words, the tool changer arm 46 is not used to hold a tool in place in order to carry out the machining operation, this task being accomplished by the spindle, the upright 12 and the head 16. This is explained in the text beginning at the bottom

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of column 3 of the Zankl patent.

It will be seen from this review that claim 1 as amended does distinguish over the teachings of this reference by reciting the following features:

- (1) An elongate support post adapted for rotation about a longitudinal axis of said post (In the Zankl reference, the tool changer drum 40 is a circular drum extending in a vertical plane and it cannot be considered an elongate post within the meaning of the present application);
- (2) Each tool member must be pivotable "to a working position where the respective tool member extends outwardly in a substantially radial direction from the longitudinal axis of the support post" (In the reference, the tool member is pivoted by means of the tool changer arm 46 to the position shown in dot dash lines in Figure 9 and in this position, the tool changer arm 46 (which the Examiner incorrectly identifies as part of the tool member) actually is parallel to the longitudinal axis of the drum, in other words, it extends in the axial direction).

By way of further explanation, the tool changer arms 46 in the reference are not in fact part of the tool members since they are not used in the actual machining operation. The tool changer arms 46 are simply used to transfer a tool (such as the tool 28 shown in Figure 1) to a spindle 20 which then carries out the machining operation in combination with the tool 28. It is respectfully submitted that in view of these clear differences, amended claim 1 does have the required novelty and is in condition for allowance together with claims 2 to 3, 5, 6 and 8 which dependent on this claim.

Independent claim 11 of the application has also been amended and it distinguishes over the teachings of the Zankl reference by reciting the following

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features:

- (1) An elongate support post adapted for rotation about a longitudinal axis of said post, which extends vertically during use of said post;
- (2) A plurality of tool members, each pivotably attached at a first end section to the post in the vicinity of the top end of the post (As explained above, the tool changer arms 46 which are pivotably mounted to the drum in the patent are not in fact tool members but are only used to change the tool member in the spindle and furthermore the arms 46 are not each mounted to the top end of a post but are rather mounted around the circumference of a drum that extends in a vertical plane);
- (3) A linear movable actuating member for selectively pivoting any one of said tool members, this actuating member being movably mounted in the support post (The plunger 64 shown in Figure 9 of the reference and relied upon by the Examiner is not an actuating member to move a tool member but rather is an actuator for moving its respective tool changer arm 46 and the plunger 64 is not mounted in a rotatable support post of the type recited in claim 11);
and
- (4) A power drive system operatively connected to a lower section of said support post (In the reference, the pneumatic cylinder 90 which is used to rotate the drum 40 is not operatively connected to the lower section of a support post).

In view of these numerous differences, it is respectfully submitted that

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claim 11 as now amended clearly distinguishes over the teachings of Zankl. For similar reasons, it is submitted that dependent claims 12 and 13 also distinguish over the teachings of this reference.

Turning now to independent claim 16 which has also been amended, it is respectfully submitted that this claim distinguishes over the Zankl reference by reciting the following features:

- (1) An elongate support post adapted for rotation about a longitudinal axis of said post, said support post having an upper section adapted for pivotably supporting said plurality of tool members;
- (2) A linear movable actuating member for selectively pivoting any one of said tool members (As indicated, the tool changer arms 46 of the Zankl reference are not in fact tool members but are simply used to change the tool that is in the spindle of the machine);
- (3) In the working position, the selected tool member must extend substantially radially outwardly from the longitudinal axis of the support post (In the Zankl reference, the selected tool member does not extend radially outwardly from any elongate support post but rather is simply mounted in the spindle of the machine);
- (4) A power drive system operatively connected to said lower section of said support post and capable of rotating said support post (The Examiner has relied upon pneumatic cylinder 82 in the Zankl reference but this cylinder is simply used to retract or extend an index pin into a corresponding index hole 78 formed in the drum 40. Although the cylinder 90 is used to rotate the drum 40, it clearly is not mounted to the lower section of a support post and it is used to

rotate a drum, not an elongate post).

With respect to independent claim 20 which is directed to a tool device for mounting in a tool supporting assembly, firstly, it is noted that each of the tool changer arms in the reference is not part of a tool device that can be mounted in a tool supporting assembly for use in a machine operation. As explained above, each arm 46 is simply used to change the tool that is used in the spindle of the machine.

With respect to the flat end surface that extends at an acute angle to the central longitudinal axis of the tool changer arm 46, the Examiner appears to be relying simply upon the bevelled corners of the enlarged end section of each arm 46, these bevelled corners extending at a 45° angle to a longitudinal axis of the arm 46. Even if these bevelled surfaces could be considered the required "flat end surface" mentioned in claim 20, which is not admitted but specifically denied, the tool changer arms 46 of the reference do not have the required "recess formed on a bottom side of the tool holder when the tool holder is horizontal during use of the tool device, this recess accommodating pivotal movement of the tool device." Although the Examiner does state that the reference does teach the use of such a recess, it is by no means clear as to what recess the Examiner relies upon in his rejection. Admittedly, the reference does teach the use of a pinion 56 which has a number of teeth that are separated by grooves. However, the pinion 56 is simply a drive component attached to the tool changer arm in order to provide means for pivoting the arm. Even if the Examiner is relying upon the grooves located between the teeth of the pinion, it is submitted that these grooves do not satisfy the requirement in claim 20 since they are not "formed on a bottom side of the tool holder when said tool holder is in the horizontal position". It should also be noted that claim 20 specifically requires that this recess be provided on the second end section of the tool holder, not on a drive component connected to the tool holder. For this reason, it is respectfully submitted that claim 20, as amended, does patentably distinguish over the

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teachings of Zankl.

Turning now to the obviousness rejection of claims 4, 9, 14 and 17 to 18 in view of the teachings of both the Zankl reference and U.S. Patent No. 5,065,492 to Von Haas et al., reconsideration of this objection is also respectfully requested. The Von Haas et al. reference admittedly teaches a machine tool turret having a plurality of tool holders and tension rod-actuated mechanisms for locking the tool head. A force is applied to the tension rod sufficient to compress a spring stack and release the tool. The mechanism for locking the tool head to the tool base holder includes radially movable members or clamping pins 17 which can be driven outwardly by a camming action of a conical surface on an end of the tension rod 6 (see top of column 6, lines 3 to 9). Although this locking mechanism is described in column 6 of the patent, the conical surface formed on the tension rod is not illustrated in the reference and therefore the manner in which it acts is not entirely clear. However apparently the movable pins 17 do form an acute angle with the axis of the assembly (column 6, lines 11 to 13). It should be noted that the movement of the tension rod 6 is to the right to move the pins radially outwardly (see column 6, lines 20 to 23) and movement is to the left for releasing the tool (see top of column 7, lines 3 and 4).

With reference now to the features recited in dependent claim 4, it is submitted that claim 4 does distinguish over the teachings of Von Haas et al. by reciting the following features:

- (1) The wedge of the actuating member must be provided on an upper section of the rod (This is not the case in the Von Haas reference where each tension rod 6 extends horizontally and thus does not have an upper section);
- (2) Each tool member must have an inclined end surface adapted for engagement with the inclined surface of the wedge (In the Von Haas reference, it is the small pins 17 which are simply part of a

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tool locking mechanism that apparently have inclined surfaces, not the tool member itself); and

- (3) Engagement must occur between the inclined end surface of the tool member and the inclined surface of the wedge “when the respective tool member is pivoted towards its working position”. (In the Von Haas reference, the engagement between the inclined surfaces does not take place after any pivotable movement of the tool member).

Accordingly, for the aforementioned reasons, it is submitted that even if the teachings of the Von Haas reference were combined with those of Zankl, the resulting combination would still not be the combination required by claim 4.

With respect to the obviousness rejection of dependent claim 9, the Von Haas patent admittedly shows in Figure 9 that compressed air can be fed through a bore in the tension rod 6 to blow clean the region in which the tool head is coupled to the tool holder. However, clearly this reference does not teach some of the features currently recited in claim 9. In particular, claim 9 requires that the air passageway which is connectible to the source of pressurized air delivers this air “to a cavity formed in an end section of said support post, which surround said end section of the elongate rod during use of said post assembly”. There is no such cavity construction in the tool turret 1 or the tool base holder 2 illustrated in Figure 1 of the Von Haas patent. The cavity feature of claim 9 is illustrated, for example, in Figure 6B of the present drawings and is identified by reference 86.

With respect to the obviousness rejection of dependent claims 17 and 18, these claims are dependent upon claim 16 and it is submitted that they are allowable for the same reasons as dependent claim 4 (see above). Claim 17 recites features similar to claim 4 while claim 18 is dependent upon claim 17.

Turning now to the rejection of dependent claims 7, 15 and 19 on grounds

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of obviousness in view of the combination of the Zankl reference, and U.S. Patent No. 5,134,767 to Yasuda, the Yasuda patent has simply been cited by the Examiner for its teaching of a motor 68 having an output shaft that is connected to a bevel gear in order to rotate a tool magazine base. The motor 68 is illustrated in Figure 6 and it drives a bevel gear 72. The Yasuda patent itself is directed to an automatic tool changing device for a machine which has a spindle head reciprocally mounted on a main frame 12. The tool changer can index tool holders 48 which are mounted in a magazine. There is a rotatable magazine base 64 which can be seen in Figure 1. Clearly, this magazine base is not an elongate post as required by independent claims 1, 11 and 16. In the reference, the magazine base 64 rotates about an inclined shaft 60. A number of tool holders are pivotably mounted on the magazine base. It should be clear from this review that because the Yasuda reference teaches a tool changing device similar to the Zankl reference, it does not overcome the deficiencies of the Zankl reference as set out above. Accordingly, it is submitted that claim 7 is allowable over the cited combination for the same reasons as stated above for claim 1 on which it depends indirectly. Similarly, claim 15 is allowable over the cited combination for the same reasons as stated above for claim 11, on which it depends. Claim 19 is allowable over the cited combination for the same reasons as stated above for claims 16 to 18 on which claim 19 depends.

With respect to the objection to claim 10 on grounds of obviousness, U.S. patent no. 5,730,691 to Tokura et al. appears to have been cited mainly for its teaching of a turret type of machine tool which is provided with six different tools for performing multiple functions. However, apart from this teaching, Tokura suffers from many of the same deficiencies as the primary reference to Zankl. For example, it is noted that the different tools are mounted on a rotatable turret head 1 that can be moved in several different directions. The turret head has tool mounting members 10 that are distributed about the circumference of the head. By the indexing of the turret head (that is, rotation about a horizontal axis), the mounting members 10 can be selectively indexed to a vertically downward

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machining position. The turret head is then lowered by downward movement of an elevating table 5 to perform the machining operation. Clearly, Tokura does not teach such features as an elongate support post adapted for rotation about a longitudinal axis of the post nor the provision of a plurality of tool members "each pivotably attached to said post and adapted to pivot from a first position used for storage --- to a working position". Accordingly, it is submitted that claim 10 distinguishes over the cited combination for the same reasons as claims 1 to 3 on which this claim depends.

With respect to the rejection of dependent claim 21 on grounds of obviousness in view of the combination of the Zankl reference and U.S. Patent No. 3,851,364 to Noa et al., it is submitted that claim 21 is allowable over the cited combination for the same reasons as stated above for claim 20. Although the Noa et al. reference does show a clamping arrangement that includes screws 65 to hold the tools 62 in the tool head, it does not overcome the other deficiencies of the Zankl reference as explained above in connection with claim 20.

Finally, with respect to the rejection of dependent claim 23 on grounds of obviousness in view of the teachings of Zankl, this objection is respectfully traversed. The angled edges on which the Examiner appears to be relying are not in fact provided for the same purpose as the flat end surface which is the subject matter of claim 23. The bevelled corners 52 of the tool holding arm are simply provided to smooth off or round off the corners at the end of the arm. In fact, these bevelled corners are not even mentioned in the text of the patent so there is no indication as to the reason for these bevels. However, the acute angle recited in claim 23 serves a specific purpose which is explained in the present application. The Examiner is referred to paragraph 48 of the present disclosure which makes reference to the inclined engagement surface 120 which has a preferred angle of 8° to 10°. As noted in this paragraph, if the angle is less than 8° "there is a danger of self-locking that may make it difficult to move the tool arm back to its storage position". The Examiner will also appreciate that because the

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angle is no more than 10°, this small angle of inclination will help with the wedging effect which locks the tool device in its working position.

Applicants respectfully submit that the present invention is not anticipated by and would not have been obvious to one skilled in the art in view of Zankl, taken alone or in combination with any of the other prior art of record.

Further remarks regarding the asserted relationship between Applicants' claims and the prior art are not deemed necessary, in view of the amended claims and the foregoing discussion. Applicants' silence as to any of the Examiner's comments is not indicative of an acquiescence to the stated grounds of rejection.

Withdrawal of the rejections under 35 U.S.C. § 102(b) and 35 U.S.C. § 103(a) is therefore respectfully requested.

Conclusion

The Examiner is respectfully requested to reconsider this application, allow each of the pending claims and to pass this application on to an early issue. If there are any remaining issues that need to be addressed in order to place this application into condition for allowance, the Examiner is requested to telephone Applicants' undersigned attorney.

Respectfully submitted,



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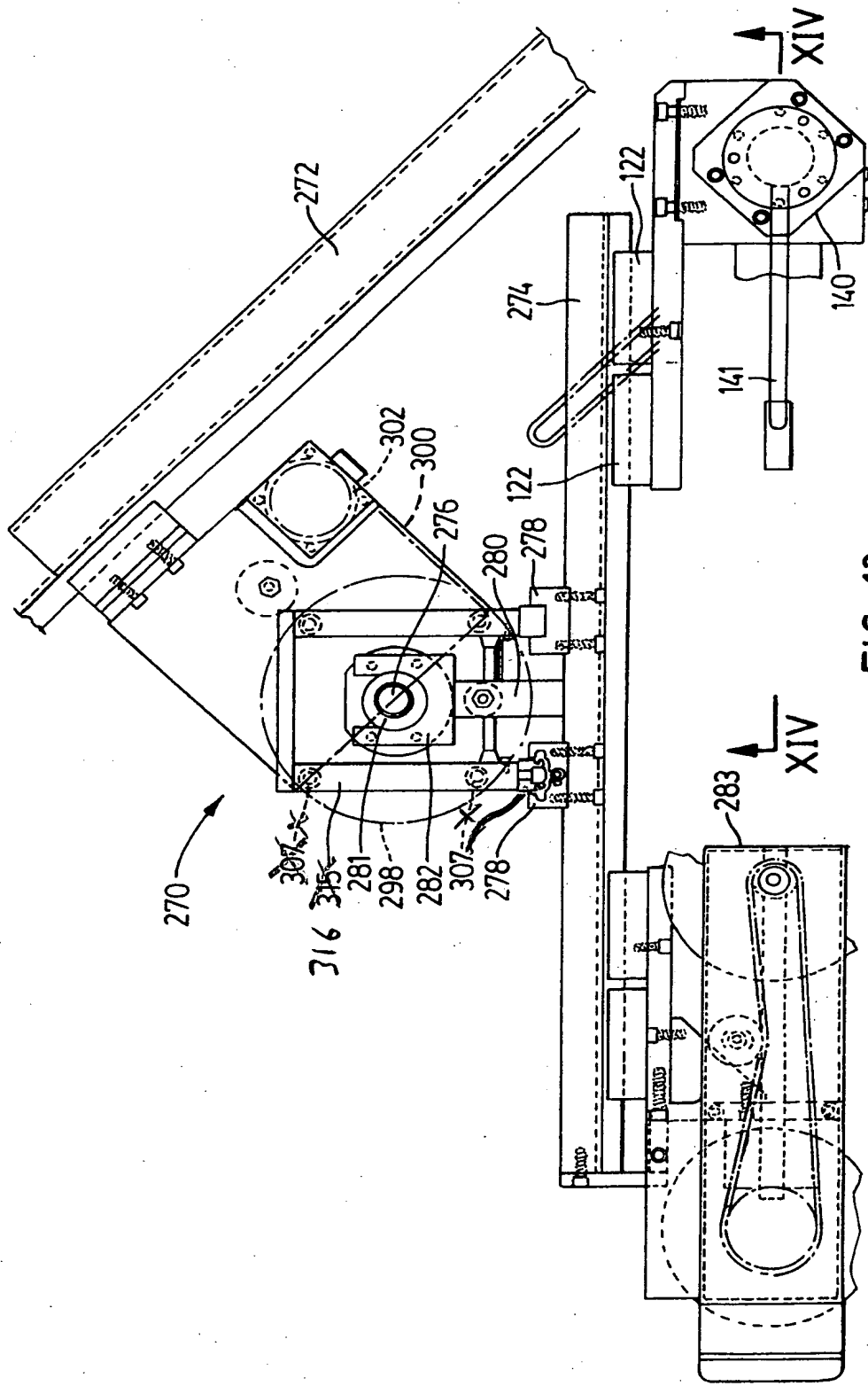


FIG. 13